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AIR UNIVERSITY

THE INACTIVE ARCTIC STRATEGY
OF THE UNITED STATES

by

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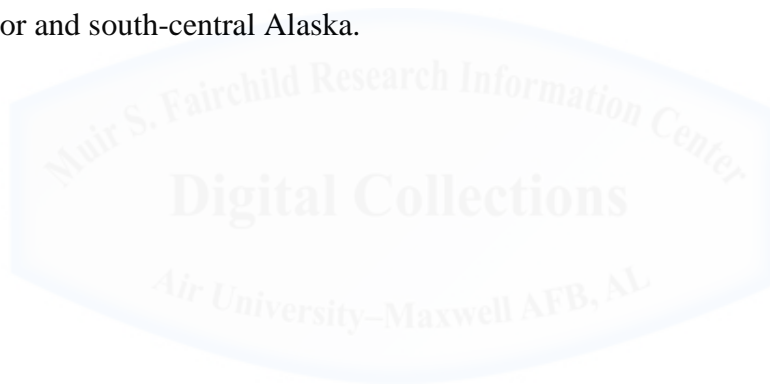
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Biography

Lieutenant Colonel Brian Fulkerson is an Alaska Air National Guard aviator assigned to the Air War College, Air University, Maxwell AFB, AL. He graduated from the University of Alaska, Fairbanks, in 1991 with a Bachelor of Sciences degree in Mathematics. He earned his pilot wings in 1993 and has over 3,700 flying hours in the T-37, T-38, and KC-135. He has served as an Aircraft Maintenance Specialist, Operations Plans Officer, Instructor Pilot, Maintenance Officer, and is a graduated squadron commander. Lieutenant Colonel Fulkerson has 24 years of military experience in Alaska and has lived there for over three decades. He has also served over 30 years in the Civil Air Patrol, conducting ground and air search and rescue throughout interior and south-central Alaska.



Abstract

The Arctic Ocean was once an impassable wall of solid ice, but this is changing. The George W. Bush administration recognized the strategic importance of the melting Arctic and published its National Security Policy Directive-66/Homeland Security Policy Directive-25 (NSPD-66/HSPD-25). The policy has survived a change of administrations, but suffers from lack of support to implement it. The purpose of this paper is to examine the need to address the implementation of NSPD-66/HSPD-25 in a more-timely manner. This paper defines the problem with a short historical background, its modern importance, the current state of affairs, and the impact of the current state of affairs on the United States' capabilities in the region. Secondly, the paper proposes several solutions to assure United States capabilities are adequate with new icebreakers, infrastructure, rules, regulations and standards, and the impact of the ratification of the United Nations Convention on the Law of the Sea. Lastly, the paper proposes more specific solutions to assure that as the United States continues on into the 21st century, it will do so better prepared to meet the challenges in the Arctic.

Introduction

For much of the history of the United States (US), the Arctic Ocean has been an impassible sea of solid ice. Only melting in small areas near the coast in summer, it was a solid stretch of ancient ice, much of which had not existed in liquid form since before the last ice age. In the 1970s, this gradually began to change. Each summer, the ice melted a little further from the shoreline; each winter, the amount of new ice created was less than what had melted during the previous summer. It is obvious that the northern ice cap is melting (see figure 1). Today, in mid-summer, much of the Arctic Ocean is ice free, and this led President George W. Bush to issue a National Security Policy Directive to address the now intermittently navigable waterway.

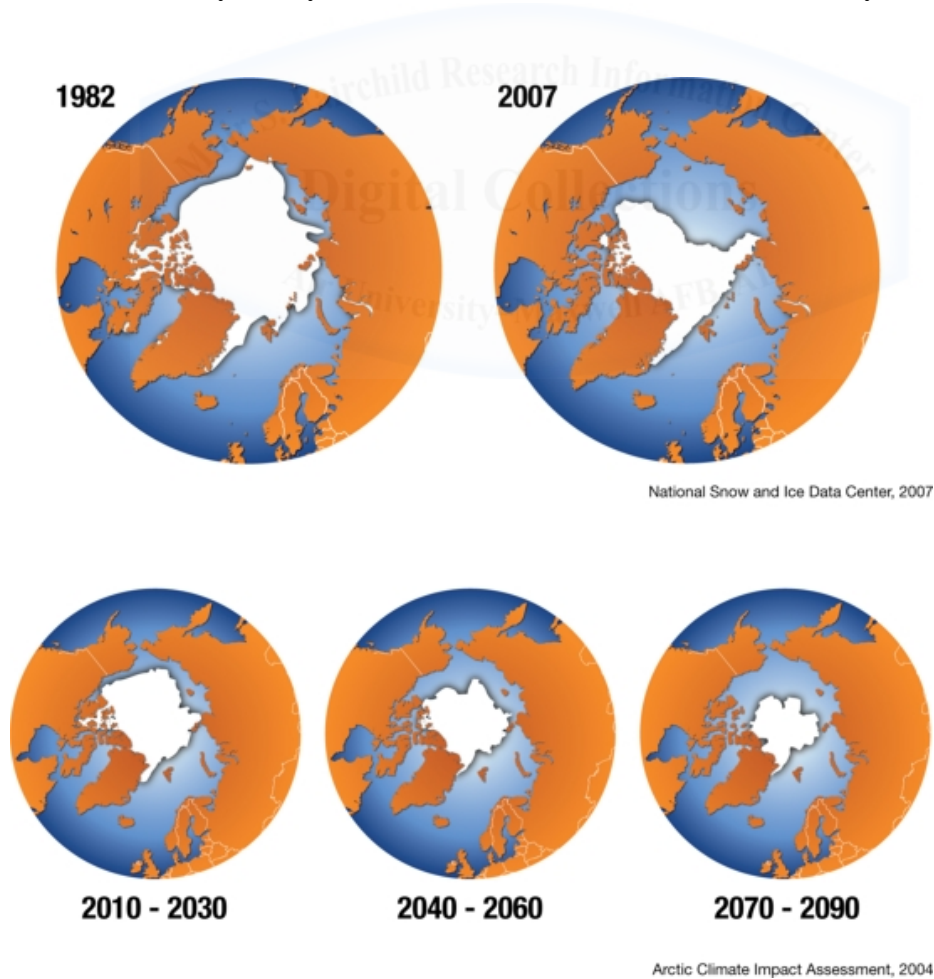


Figure 1¹

The previous policies of the United States had been made obsolete by climate change. As commercial and passenger vessels increasingly utilized the waterway, new US policies were needed. Combined with territorial disputes and abundant natural resources, this prompted the second Bush administration to create its National Security Policy Directive-66/Homeland Security Policy Directive-25 (NSPD-66/HSPD-25). The Bush administration created NSPD-66/HSPD-25 to ensure the US had a roadmap for the future of US interests in the melting Arctic.

The purpose of this paper is to examine the need to address the implementation of NSPD-66/HSPD-25 in a more-timely manner. The US is not paying attention to the importance of this policy and thusly ignoring the strategic importance of the Arctic Ocean's role in the future of US security. The National Security Policy Directive mandated the "deployment of sea and air systems for strategic sealift, strategic deterrence, maritime presence, and maritime security operations; and ensuring freedom of navigation and overflight."² As of the writing of this paper, the US has yet to commence these deployments.

This paper will explore issues surrounding the US approach to the Arctic by first defining the problem with relevant information on the region consisting of a short historical background, its modern importance, the current state of affairs, and the impact of the current state of affairs on US capabilities and security in the Arctic. Second, a list of potential solutions to the current state of affairs will be presented, consisting of icebreakers, infrastructure, rules, regulations and standards, and treaty ratification. Lastly, this paper will provide specific recommendations on how to best implement the strategy embedded in NSPD-66/HSPD-25.

Defining the Problem

Historical Background

The US became an Arctic country in 1867 with the purchase of Alaska from Russia for 7.2 million dollars.³ The purchase gave the US a wealth of natural resources including huge fields of oil and natural gas, fish stocks, zinc, lead, silver, chromium, copper, oil-shale, uranium, and gold.⁴ Many of these resources, and the Arctic in general, fall above the Arctic Circle which is 66° 30' North Latitude (see figure 2).⁵ None of these Arctic resources were appreciated until the discovery of gold in the late 1870s.⁶ Most underappreciated was that this new territory enabled “direct participation in critical circumpolar negotiations with regard to security measures, laws of the sea, sovereignty, economic development and environmental concerns.”⁷

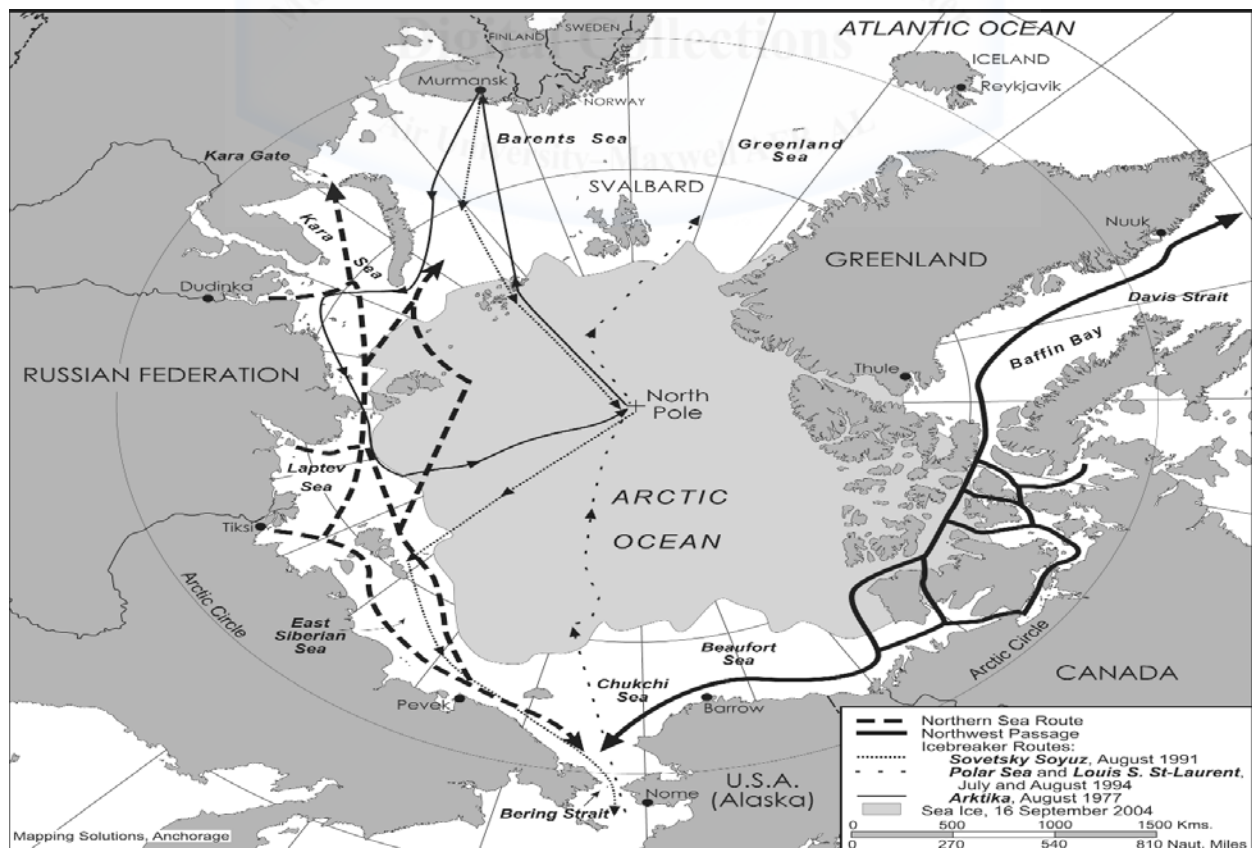


Figure 2⁸

The high latitude of the Arctic historically has acted as a barrier and when Alaska was purchased, it was never expected to become navigable, but this is changing.⁹ Climate change has slowly decreased the seasonal extent of Arctic sea ice thus allowing increased shipping activity for longer periods each year. The rate of ice-cover change is fairly consistent at about -3.5 percent per year (figure 3) with historic low coverage in August 2007. The record for the lowest amount of average sea ice for the entire year was set in 2011.¹⁰ The average thickness in the ice has also declined from 3.64 meters in 1980 to 1.89 meters in 2008 making it easier to transit for icebreaking vessels.¹¹

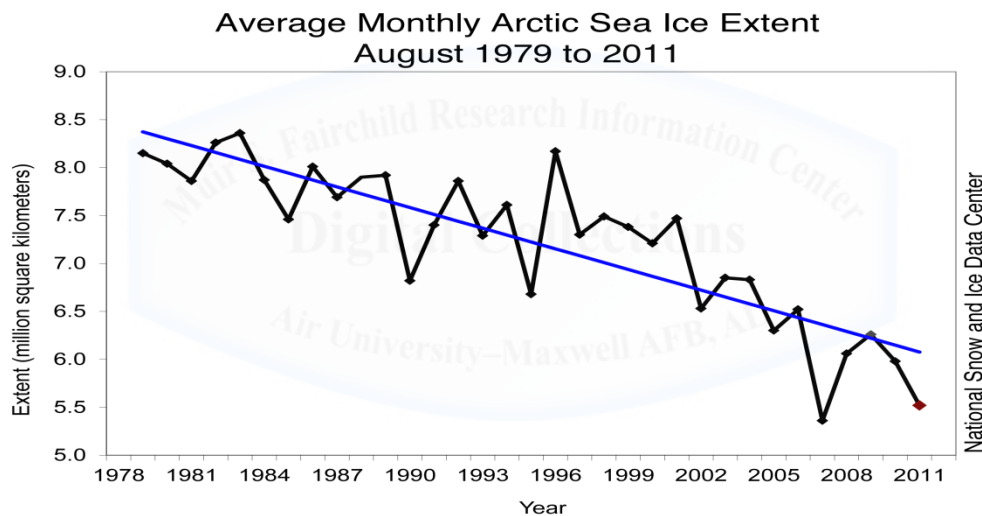


Figure 3¹²

As a result of the opening Arctic, the Bush administration published a new policy in January of 2009. This document took global climate change as well as the changing world security situation into account.¹³ It consists of six basic policies: meet the national security and homeland security needs relevant to the Arctic, protect the environment and conserve its biological resources, ensure that natural resource management and economic development are environmentally sustainable, strengthen institutions for cooperation among the Arctic nations,

involve the indigenous communities in decisions that affect them, and enhance scientific monitoring and research.¹⁴ The Obama administration chose to continue NSPD-66/HSPD-25 rather than replace it. The administration's goals for the Arctic are nearly identical to the Bush policy.¹⁵ Ideologically there is no need for a new policy, but there is a need to support it.

Modern Importance

Within the policy of “meeting the national security and homeland security needs in the Arctic” mentioned above, NSPD-66/HSPD-25 describes US security interests as missile defense and early warning; deployment of sea and air systems for strategic sealift, strategic deterrence, maritime presence, and maritime security operations; and ensuring freedom of navigation and overflight.¹⁶ The policy notes that the US should be prepared to operate either independently or in conjunction with other states to safeguard these interests.¹⁷ A fundamental US homeland security interest in the region is preventing terrorist attacks and mitigating those criminal or hostile acts that could increase US vulnerability in the Arctic.¹⁸ The policy notes that the US requires a more active and influential national presence to protect its Arctic interests and to project sea power throughout the region.¹⁹ The US plans to defend these interests “in accordance with lawful claims of United States sovereignty, sovereign rights, and jurisdiction in the Arctic region, including sovereignty within the territorial sea, sovereign rights and jurisdiction within the United States Exclusive Economic Zone and on the continental shelf, and appropriate control in the United States contiguous zone.”²⁰

Several things are needed to facilitate protection of the above mentioned interests in the Arctic region. Freedom of the seas is “a top national priority” and the Northwest Passage and the Northern Sea Route (see figure 2) are straits used for international navigation and “the regime of

transit passage applies” to them.²¹ The policy further directs the US Government to develop greater capabilities and capacity, to protect US air, land, and sea borders; increase maritime domain awareness in order to protect maritime commerce, critical infrastructure, and key resources; preserve the global mobility of the US military and civilian vessels and aircraft; project a sovereign US maritime presence in support of essential US interests; and encourage the peaceful resolution of disputes in the region (see figure 4).²²

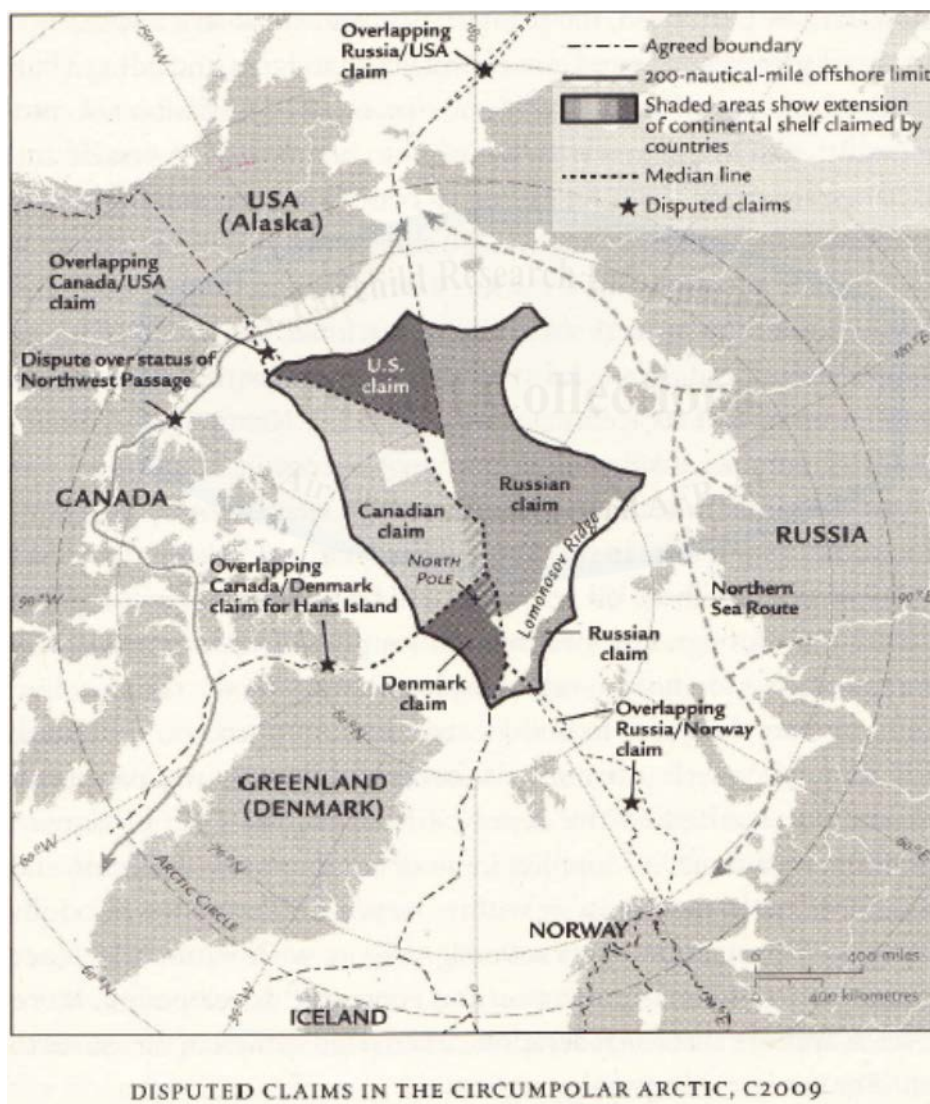


Figure 4²³

The Arctic is rich in proven resources and may hold up to 13 percent of the world's undiscovered oil, 30 percent of the undiscovered natural gas, and 20 percent of the undiscovered natural gas liquids for a total of 22 percent of the world's undiscovered, recoverable energy resources, most of which lie in Russian claimed territory.²⁴ As the Arctic opens, increasing human activity will impact the region as these resources are extracted (see figure 5). The US controls a small amount of these resources, but they could provide up to 6 years of domestic oil consumption.²⁵



Figure 5²⁶

Another result of an opening Arctic is increased international shipping.²⁷ These ships will pass through the 70 mile gap of the Bering Strait entering or leaving the Arctic. As these

ships pass through the Strait, and then transit around the north coast of Alaska, or vice versa, they will increase the demand for services usually provided to major oceanic transit routes. For the US, this means additional resources will need to be devoted to monitoring, controlling traffic, search and rescue, spill response, and law enforcement; all of which need to extend well above the Arctic Circle.

Current State of Affairs

The US is failing in meeting the US security needs relevant to the Arctic. Currently, there is one operating medium icebreaker in the United States Coast Guard (USCG).²⁸ The USCG has two other heavy icebreakers, the Polar Sea and Polar Star, but the Polar Sea is broken with engine problems and faces decommissioning due to lack of funds while the Polar Star is in refit until 2013 to extend its use out to 2021.²⁹ The remaining icebreaker (Healy) is primarily used for polar scientific research, and is operated under a cost sharing with the National Science Foundation.³⁰ The Healy's service life does not end until 2030, making it the sole projected icebreaker for a decade.³¹ The Healy has an operating limit of 8 feet of ice which makes it incapable of operating in much of the multi-year ice in the Arctic.³² This limit also makes it more prone to becoming stuck in thicker ice.³³ As the sole US icebreaker, the Healy has no safety backup. The Polar Star and Polar Sea can cruise in ice 6 feet thick and can break ice up to nearly any thickness found in the Arctic thanks to their special heeling system.³⁴

The remaining surface assets available for the region are USCG cutters or Navy surface ships with no icebreaking capabilities. These assets are limited to ice-free operations as even light contact with ice could be catastrophic. Furthermore, the US Navy has no icebreaking capability whatsoever and none of the USCG cutters or US Navy surface ships are designed to

handle Arctic conditions, which makes them unsuitable for operations in the region for most of the year. In addition, there is no infrastructure to service or support ships within 1000 miles of the Arctic Ocean, with the nearest refueling port being Dutch Harbor.³⁵ Due to distances involved, loiter time for cutters is a few days to a few hours, but only during the summer.³⁶ In summary, other than the icebreaker Healy, the only vessels that the US can operate year-round in the region are Navy submarines.

While the USCG does have airborne assets in Alaska, their bases at Kodiak and Sitka place them too far from the Arctic to properly conduct operations in support of NSPD-66/HSPD-25 policies.³⁷ This 800 mile distance converts response time into days for cutters and hours for airborne assets.³⁸ Helicopters station to the Arctic coast in the summer, but lack facilities to operate year-round as there are no heated hangars.³⁹ Helicopters are also slow to respond and may take days to position.⁴⁰ Fixed-wing assets are able to respond quicker, but also lack support.⁴¹ Both assets suffer from inadequate support and infrastructure on the north coast, making operations seasonal at best.⁴²

The USCG relies on the Alaska Air National Guard (AKANG) as the primary responder for winter operations, but these assets also have long transit times.⁴³ Due to the length of the Arctic winters, for much of the year the AKANG “has it.”⁴⁴ The AKANG operates rescue helicopters and fixed-wing refueling assets that allow for much longer missions.⁴⁵ These rescue assets are based in Anchorage and rarely position north of Fairbanks, where they maintain a detachment at Eielson Air Force Base (AFB).⁴⁶ Transit times to the north coast are measured in hours, even from Eielson, as it is still over 400 miles to the Arctic coast.

The Dalton Highway is the only road to the North Slope of Alaska. This gravel highway starts north of Fairbanks, and ends 414 miles later in Deadhorse, just south of Prudhoe Bay.⁴⁷ Few villages between Fairbanks and Deadhorse offer even the basic amenities (see Image 1).⁴⁸ Most Arctic villages are only accessible by air, or by water during ice free months, and rely on resupply by barge during the summer as winter complicates the process.⁴⁹



Image 1⁵⁰

Communications capabilities across the Arctic region are minimal and do not meet the requirements of conducting 24-hour operations. There is only one military satellite communications platform (MILSATCOM) in polar orbit supplying satellite communications (SATCOM) capability.⁵¹ Voice communications are limited due to lack of transmitters and the vast distances involved (see figure 6).⁵² Recently, a satellite was launched giving two hours of VHF communications four times per day in the region, but this still leaves 16 hours per day uncovered.⁵³ Currently, HF and SATCOM communications are the only fairly reliable options, and during solar flares, these communications are subject to disruption.⁵⁴

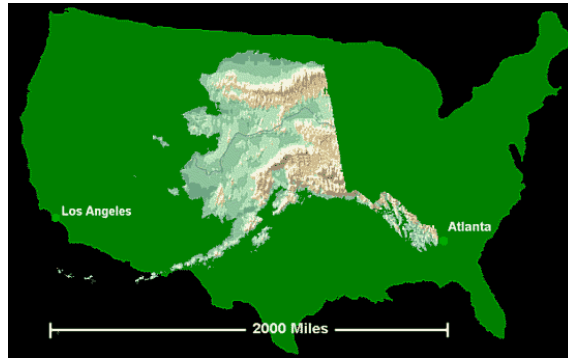


Figure 6⁵⁵

Ship monitoring capability is too limited to achieve the proposed policy objectives. The USCG purchases ship traffic information from the Marine Exchange of Alaska.⁵⁶ The Exchange operates 7 Automatic Identification System (AIS) receivers in the Arctic, but on a primarily seasonal basis.⁵⁷ The AIS receivers are currently limited to 50 miles which is far short of covering out to the 200 mile Exclusive Economic Zone.⁵⁸ The USCG has no other intelligence gathering or ship monitoring capability beyond this.⁵⁹

The US has been active in supporting the remaining policies through the Arctic Council. The Council makes no mandates, but seeks to promote “cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic.”⁶⁰ The Council has suggested protected areas for fish stocks while the US has banned commercial fishing until studies are completed.⁶¹ The Council completed the Arctic Marine Shipping Assessment (AMSA) in 2009. This study identified numerous shortfalls in the region and made recommendations to the International Maritime Organization “to strengthen, harmonize and regularly update international standards for vessels operating in the Arctic.”⁶² These updates would protect and conserve the Arctic from shipping as the ice recedes. The Council provides input to the UN and other

organizations to advance the safety of Arctic shipping.⁶³ This includes suggestions for passenger ship safety, uniform shipping regulations, cooperative Search and Rescue, spill prevention, marine mammal monitoring, building marine infrastructure, monitoring human impact, and sharing data.⁶⁴

Impact of the Current State of Affairs

While the US languishes, other countries are implementing plans for an increased Arctic presence. In 2010, US Arctic capability decreased by one heavy icebreaker and there is no funding to replace or increase this capability anywhere in the budget at least out to 2015. Meanwhile, other nations continue to build resources and expand bases in the north. Russia has 20 icebreakers and plans on doubling the capacity of Murmansk by 2015.⁶⁵ Canada is investing in ice-strengthened patrol ships for the Northwest Passage (NWP), a deep-water port, and an Arctic Training Center for its crews.⁶⁶ Norway has produced ice-resistant patrol boats, and Denmark has plans for a second.⁶⁷ Even China has a heavy icebreaker, needing “brothers and sisters,” with a second to be finished in 2013.⁶⁸

While other countries are working quickly to develop their Arctic capabilities, the only active US plan is the Navy Arctic Roadmap, and it is merely in its first phase of assessing capabilities and requirements. It will make recommendations for funding at the end of FY 11-12 for submission in the FY-14 budget.⁶⁹ Debates will most likely draw this out and delay procurement.

The USCG cannot meet its responsibilities in the Arctic and has contracted out to Russia to make up for it.⁷⁰ Prior to the Navy’s involvement, the USCG published its High Latitude

Study which called for six icebreakers.⁷¹ The study assessed the cost of the new ships to be over \$4.3 billion.⁷² Two icebreakers are inadequate to project US sovereignty or persistent presence, reducing the US to merely a seasonal force in the Arctic. When a ship or a town needs assistance, as happened in the Nome fuel crisis, Russian or other assistance may be needed again.⁷³

Relying on Russian help has its own risks, as it has aggressively staked claims to vast areas of the seabed and planted a flag on the Lomonosov ridge at the North Pole.⁷⁴ Russia claims nearly half of the Arctic and is a country with a record indicating it is not afraid to flex its might.⁷⁵ Russia sees Arctic resources in its future as an “economic superpower.”⁷⁶ Though it may lack the modern technology and capability to extract oil and gas from the Arctic, it has ships capable of carrying those resources throughout the year.⁷⁷

Below southeast Russia lies all of Asia, which also stands to benefit from Arctic resources and a four thousand mile shorter route to Europe across the Arctic.⁷⁸ China shows an interest in the Arctic which it sees as “global resources.”⁷⁹ China’s energy demand may increase 75 percent by 2035 and the Arctic could provide some of it.⁸⁰ The offer of “cooperation in fields like hydrocarbons and hard minerals” from Russia is also a reason for Chinese interest.⁸¹ A large new Embassy in Iceland could indicate China anticipates a base for trans-shipment of goods and resources.⁸² Commercial shipping will require infrastructure on a commercial scale to provide fueling, servicing, and transshipment between ice-strengthened and normal ships at either end of the Arctic Ocean.⁸³ With dual-acting cargo ships also being produced in Malaysia and South Korea, other countries seem to be planning for this eventuality as well.⁸⁴ This increased presence will not wait for the US to catch up as it continues to expand.⁸⁵ The Northern

routes could possibly cut shipping costs by up to 20 percent, guaranteeing that seasonal volume will increase as multi-year ice decreases.⁸⁶ With a large fleet of heavy icebreakers, Russia could open a central Arctic route which would shorten the trip even further. As the extent of multi-year ice diminishes, ice strengthened ships could become the preferred mode of transportation in the Arctic for much of the year.

Regardless of origin, the US is not ready for increased Arctic traffic. There is no reliable way to identify or track ships north of the Bering Strait.⁸⁷ Ships other than icebreakers are already showing up in the Arctic.⁸⁸ Any ship with range enough to make the trek could make it to Alaska's north coast unchallenged, creating a security gap. Lack of infrastructure and monitoring capabilities leads to a lack of enforcement, rescue, and spill response capability as well. If new Arctic shipping codes are enacted, the US has limited resources to enforce them. The US would likely not know if an accident, incident or incursion did happen.⁸⁹ In short, the US is not sovereign over its own territory in the Arctic, choosing to leave parts of its country as ungoverned spaces.

Another problem amongst the ungoverned spaces of the Arctic is claims to resources on the extended continental shelf. As mentioned, Russia planted a flag on the Lomonosov Ridge, but did so while conducting research to substantiate its claims under the United Nations Convention on the Law of the Sea (UNCLOS). Canada, Denmark, and Norway have similar claims as does the US.⁹⁰ The difference between the US and the other countries is that the US has not ratified the Convention.⁹¹ This gives the US no legal basis to make claims past its 200 mile Exclusive Economic Zone.⁹² The US Senate has not voted on the Convention due to sovereignty concerns, but those concerns were addressed before the Convention was finalized.⁹³

Ironically, those very concerns are decreasing US sovereignty over its own territorial waters now. Any country could extract resources 201 miles off the coast of Alaska with the US having no legal basis to block it. Without the necessary infrastructure to monitor its continental shelf, the US may not even know when such exploitation begins.

With an increase in shipping comes the need for hydrographic, meteorological and oceanographic data sufficient to assure safe navigation with accurate weather and ice flow conditions.⁹⁴ Though a recent satellite launch added some communications capability, it is not persistent nor does it meet intelligence, monitoring, tracking, or environmental information needs.⁹⁵ Currently, there is incomplete hydrographic data and insufficient meteorological and oceanographic data, making transit risky at best. Satellite coverage of ice flows will be required to facilitate safe shipping and reduce the need for incident response and SAR.⁹⁶ The time to establish a capability should not be after a ship sinks, people have died, or a disaster occurred unanswered.

Solutions

Icebreakers

The US could refurbish its existing heavy icebreakers and build two new ones. In addition, another medium icebreaker is also needed to fulfill USCG requirements.⁹⁷ The USCG estimates \$500 million to refit existing icebreakers for another thirty years of use.⁹⁸ A new heavy icebreaker could cost \$1 billion dollars and take 8 to 10 years to build.⁹⁹ Failure to fix the icebreaker fleet will lead to little or no year-round capability in the Arctic by 2030. Refurbishing ships in a fiscally constrained environment helps offset costs. In lieu of one, or in addition to

new heavy icebreakers, the US could follow Denmark and Norway with 4 smaller ice strengthened patrol boats for thinner or intermittent ice. These patrol boats would be cheaper to build and bridge the gap between icebreakers and cutters. Building or refurbishing will be an uphill battle upon which US Arctic sovereignty depends.

Infrastructure

To support their new and legacy ships, bases, and information needs, the Navy and USCG should blend their communications requirements into a single satellite and communications network for the Arctic, satisfying all requirements. The National Science Foundation and the National Oceanic and Atmospheric Administration could also be leveraged to provide input and possible funding for the effort. Private industry is not likely to build or operate them itself as the costs are high. Private industry would benefit from the services much the same as they benefit from the interstate system, and could offset costs by user fees for the services. This common operating network will give the US the intelligence picture it needs to secure the northern border, while at the same time ensuring safe Arctic maritime traffic operations and continuing scientific research. The Russian system “Arktika” is already underway and is scheduled to be launched in 2013.¹⁰⁰ Arktika’s four satellites will use radios, radar, and hydro-meteorological monitoring to assure more precise weather prediction for the Northern Hemisphere, assessment of emergency situations, and guarantee reliable communication and television links to the region.¹⁰¹ Though the Russians are eager to attract partners for this venture, it is not wise to rely on a country that blocked 11 of 13 requests for access to its Arctic waters for scientific research.¹⁰² US safety and sovereignty in the region should be reliant on US systems.

Earth-based infrastructure is also needed to establish a permanent US presence in the Arctic, namely, one port on the Arctic Ocean and one closer to the Bering Strait. With sufficient capabilities, these ports could be used year-round allowing for adequate and timely contingency response and persistent operations. The town of Nome is close to the Bering Strait and offers existing infrastructure and port facilities that could be expanded to meet USCG and Navy needs. The Arctic has no such infrastructure and suffers from a shallow slope and lack of a good area to establish a deeper water port except perhaps near Barrow.¹⁰³ Private industry is also not likely to build or operate these ports as the costs are prohibitively high. Senate Bill 2849 requires a study on the feasibility and potential of establishing a deep water sea port in the Arctic, but has not been voted on.¹⁰⁴ These ports and USCG stations in the Arctic will ensure the US will not be limited to seasonal operations.

Rules, Regulations, and Standards

Along with the capability to enforce them, binding rules, regulations, and standards for civilian maritime operations and shipbuilding for the Arctic are needed. Standards for hull strength, construction, and buoyancy considerations for conditions of heavy icing need to be formalized. In addition, emission standards and ballast water mitigation also need to be addressed. This would be most effectively accomplished through Arctic Council input to the International Maritime Organization. The Council best represents the countries and indigenous peoples of the region. The Council should be the source of international laws in the Arctic and could also provide the capability to enforce them. Unfortunately, the Council sees no need to do so.¹⁰⁵ The US needs to take leadership on this issue and strengthen the Council's influence in the UN. This could ensure that non-Arctic interests would not dominate the future of the region.

Treaty Ratification

In order to legally enforce and support international rules, regulations, and standards, the US Senate should ratify the UNCLOS. This would give the US a legal basis for making or responding to territorial claims in the Arctic Ocean. Ratification would remove the perception of US reluctance to engage multilaterally in the Arctic.¹⁰⁶ It would also prevent a de facto loss of sovereignty past the US' 200 mile Exclusive Economic Zone.

Recommendations

Build New and Refurbish Current Icebreakers

To support its interests and enforce law in the Arctic, the US should refurbish both heavy icebreakers while building one new heavy and one new medium icebreaker. In addition to these new ships, the US should also build 4 new, ice strengthened patrol boats to fill the gap between cutters and icebreakers. This will fulfill the need to provide appropriate resources to the USCG as already identified above, and give the US enforcement capabilities as well as a persistent presence in the Arctic.

Infrastructure Improvements

To provide a base of operations for US capabilities, a study to select the best coastal location for a new deep water port on the north coast of Alaska should be immediately commissioned by passing Senate Bill 2849. Operations and logistics facilities for Navy, USCG forces, and disaster response capabilities in the Arctic should be included in the funding for any

new port or facilities. In addition, another study on how best to expand the existing facilities in Nome to accommodate a new USCG and Navy presence is also in order.

Providing adequate communications, safe navigation, and a better intelligence picture to USCG and Navy assets requires adequate satellite coverage which must be resourced. Existing coverage and capabilities are inadequate, requiring new satellites which must be funded to cover the Arctic Ocean. Reliable, weather resistant land based navigation aids and ship tracking and control capabilities should also be established along Alaska's Arctic coast to augment or replace the existing system.

Rules, Regulations, and Standards

Along with being able to see what is happening in the region, the US should continue working through the Arctic Council to establish appropriate maritime operating procedures and construction standards to make commercial transit as safe as possible. The Council should also create and put forth common rules, operating procedures, and ship building standards for the Arctic through the International Maritime Organization and should be the Arctic's unified voice for maritime concerns.

Ratify the UNCLOS

To credibly and lawfully support its maritime concerns in the Arctic, the US should immediately bring the ratification of the UNCLOS to a vote on the Senate floor. It has broad support from the President, military, international community and both houses of Congress.¹⁰⁷ It will show that the US has moved beyond unilateral action and is willing to lead by example.

Most importantly, it will legitimize US claims and provide a peaceful venue for resolution dispute.

Establish Seabed Claims

Once the UNCLOS is ratified, the US should immediately file claims to the extended continental shelf off the coast of Alaska to ensure exclusive access to the natural resources contained therein (see Figure 5). These claims would guarantee exclusive access to the Chukchi Basin and the remaining continental shelf outside the 200 mile Exclusive Economic Zone (see Figure 7). This claim will also give the US a legal basis to ensure that shipping rules and regulations are followed and that fishing quotas are enforced. In short, these claims will increase and solidify US sovereignty in the Arctic.

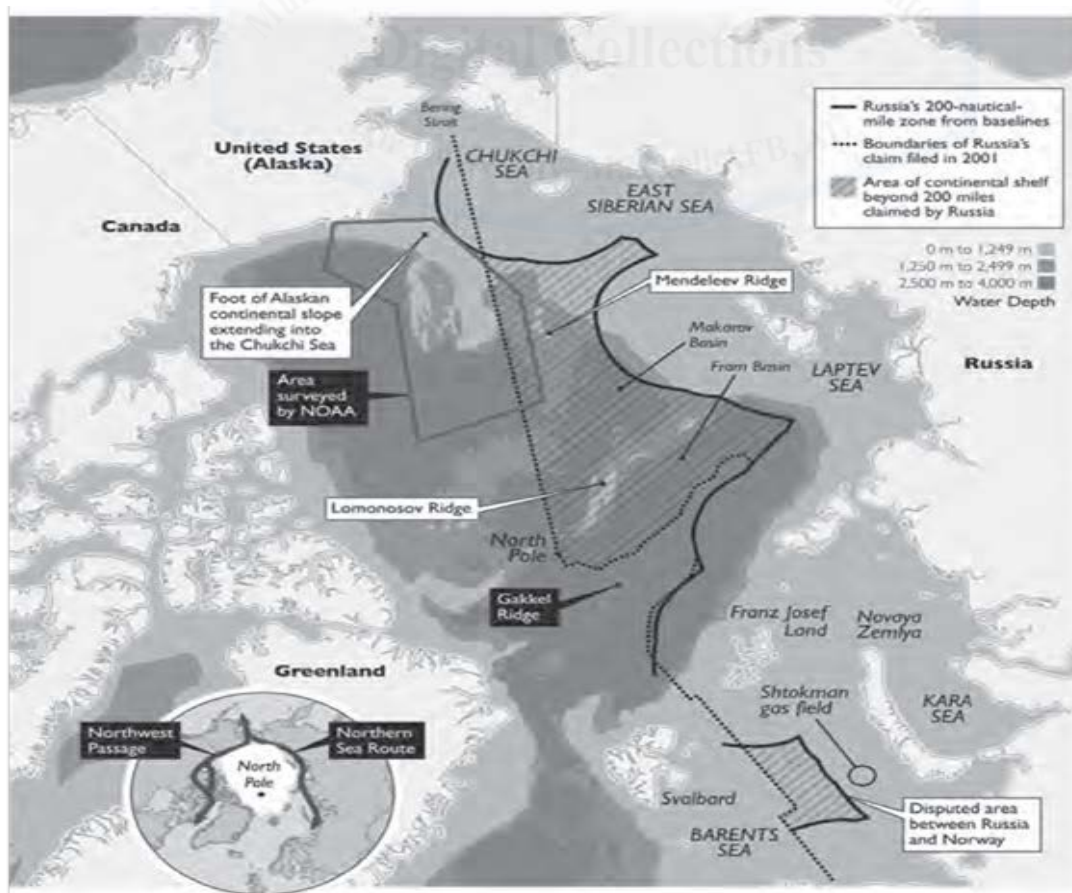


Figure 7¹⁰⁸

Conclusion

The US has an adequate Arctic Strategy that suffers from poor execution. Support of this policy is lagging, resulting in slow implementation. The future activity and economic importance of the region warrant a greater emphasis on achieving full implementation more rapidly. The Coast Guard needs more icebreakers and the region needs infrastructure for its base of operations. The region needs binding rules, regulations, and standards to protect the fragile environment. Most importantly, the US needs to assure it has a legal basis for its sovereignty claims.

The US is not currently paying enough attention to the importance of the strategic value of the Arctic Ocean and its role in the future of US security. The current strategy sufficiently covers what needs to be focused on in the Arctic, but there is a lack of action on the part of the nation. As the US continues on into the 21st century, it does so ill-prepared to meet the challenges in the Arctic.

Bibliography

- Antrim, Caitlyn. "The Next Geographical Pivot: The Russian Arctic in the twenty-first Century." *Naval War College Review*, vol. 63, no. 3 (Summer 2010)
<http://www.usnwc.edu/getattachment/f8217b41-afd2-4649-8378-7b6c8a7e61d2/The-Next-Geographical-Pivot--The-Russian-Arctic-in> (accessed 9 December 2011)
- Baev, Pavel K. *Russian Energy Policy and Military Power: Putin's Quest for Greatness*. Routledge, Taylor & Francis Group, New York, New York, 2008
- Berley, Max, and Lisa Beyer. "To Rule the Arctic's Waves, U.S. Can't Waive the Rules: View." *Bloomberg Business Week*, October 5, 2011 <http://www.businessweek.com/news/2011-10-05/to-rule-the-arctic-s-waves-u-s-can-t-waive-the-rules-view.html> (accessed 1 January 2012)
- Bird, Kenneth J., Ronald R. Charpentier, Donald L. Gautier, David W. Houseknecht, Timothy R. Klett, Janet K. Pitman, Thomas E. Moore, Christopher J. Schenk, Marilyn E. Tennyson, and Craig J. Wandrey. *Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*. U.S. Geological Survey Fact Sheet 2008-3049 (Denver, Colo. U.S. Geological Survey Information Services, 2008)
<http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf> (accessed 9 December 2011)
- Blank, Stephen J. *Russia in the Arctic*. Strategic Studies Institute, July 2011
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubid=1073> (accessed 22 January 2012)
- Colvin, Christopher C. Rear Admiral, Deputy Commander Pacific Area, United States Coast Guard. Interview conducted on September 12, 2011
- Committee on the Assessment of U.S. Coast Guard Polar Icebreaker Roles and Future Needs. *Polar Icebreakers in a Changing World: An Assessment of U.S. Need*. National Research Council of the National Academies, The National Academies Press, Washington D.C., 2007
- Corell, Robert and Erik J. Molenaar. "Background Paper: Arctic Shipping." *Arctic Transform*, February 12, 2009 <http://arctic-transform.org/download/ShipBP.pdf> (accessed 23 January 2012)
- European Security and Defense Assembly. *Europe's Northern Security Dimension*. Report on December 4, 2008 http://www.assembly-weu.org/en/documents/sessions_ordinaires/rpt/2008/2016.php (accessed on 10 December 2011)
- Farrell, Brett. Marine Exchange of Alaska Assistant Director. Interview conducted on 25 January, 2012
- GeoPolitics in the High North. *SWP Colloquium on Arctic Security*, July 6, 2011
http://www.geopoliticsnorth.org/index.php?option=com_content&view=article&id=172%3Aswp-colloquium-on-arctic-security&catid=1%3Alatest-news&Itemid=1 (accessed 10 December 2011)
- Grant, Shelagh D. *Polar Imperative: A History of Arctic Sovereignty in North America*. Douglas & McIntyre, Vancouver, British Columbia, 2010
- Greenert, J. W. *U.S. Navy Arctic Roadmap*. United States Navy, October 2009
http://www.navy.mil/navydata/documents/USN_artic_roadmap.pdf (accessed 23 January 2012)

- Halpin, Tony. "Russia Warns of War Within a Decade Over Arctic Oil and Gas Riches." *TimesOnline*, May 14, 2009 <http://www.thetimes.co.uk/tto/environment/article2144432.ece> (accessed 10 December 2011)
- Huebert, Rob. *Welcome to a new era of Arctic Security*. Canadian Defense and Foreign Affairs Institute, August 24, 2010 <http://www.cdfai.org/PDF/Welcome%20to%20a%20new%20era%20of%20Arctic%20Security.pdf> (accessed 9 December 2011)
- Institute of the North, U.S. Arctic Research Commission, and International Arctic Science Committee. *Arctic Marine Transport Workshop 28-30 September 2004* <http://www.institutenorth.org/programs/arctic-advocacy-infrastructure/arctic-maritime/arctic-marine-transport-workshop/> (accessed 10 January 2012)
- International Energy Agency. *World Energy Outlook 2010: Executive Summary*. Organisation for Economic Co-operation and Development, 2010 <http://www.iea.org/Textbase/npsum/weo2010sum.pdf> (accessed 23 January 2012)
- Jakobson, Linda. *China Prepares for an Ice-Free Arctic*. SIPRI Insights on Peace and Security, No. 2010/2, March 2010 <http://books.sipri.org/files/insight/SIPRIInsight1002.pdf> (accessed 1 January 2012)
- Kandiyoti, Rafael. *Pipelines: Flowing Oil and Crude Politics*. I. B. Tauris & Co. Ltd, London, 2008.
- Lasserre, Frederic. *China and the Arctic: Threat or Cooperation Potential for Canada?* Canadian International Council, China Papers No. 11, June 2010 <http://www.opencanada.org/wp-content/uploads/2011/05/China-and-the-Arctic-Frederic-Lasserre.pdf> (accessed 9 December 2011)
- Maritime International Secretariat Services Limited (Marisec). *Key Facts Overview of the International Shipping Industry*. <http://www.marisec.org/shippingfacts/keyfacts> (accessed 1 January 2012)
- Mukusch, Caroline. "The Arctic Sea Competition and Key Strategic Challenges for Europe." *Second Line of Defense*, November 18, 2010 <http://www.sldinfo.com/the-arctic-sea-competition-and-key-strategic-challenges-for-europe/> (accessed 10 December 2011)
- Murkowski, Lisa. *S.2849: Arctic Deep Water Sea Port Act of 2009*. <http://www.gpo.gov/fdsys/pkg/BILLS-111s2849is/pdf/BILLS-111s2849is.pdf> (accessed 10 December 2011)
- National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. *The Challenges of Oil Spill Response in the Arctic*. Staff Working Paper No. 5, January 11, 2011 <http://www.oilspillcommission.gov/sites/default/files/documents/Updated%20Arctic%20Working%20Paper.pdf> (accessed 9 December 2011)
- Natyvczyk, Walt. *Canada's Strategic Outlook*. The All Party Parliamentary Group on Transatlantic and International Security, February 11, 2011 <http://www.henryjacksonsociety.org/stories.asp?id=1948> (accessed 9 December 2011)
- O'Rourke, Ronald. *Changes in the Arctic: Background and Issues for Congress*. Congressional Research Service, December 23, 2011 <http://www.fas.org/sgp/crs/misc/R41153.pdf> (accessed 16 January 2012)
- Patch, John. "The Overstated Threat." *Proceedings Magazine*, Vol. 134/12/1,270, December 2008 <http://www.usni.org/magazines/proceedings/2008-12/overstated-threat> (accessed 1 January 2012)

- Rowe, Elana W. *Russia and the North*. University of Ottawa Press, Ottawa, 2009
- RT.com. *Scientists continue work to substantiate Russia's Arctic claims*. October 9, 2010
<http://rt.com/news/sci-tech/arctic-lomonosov-ridge-expedition/print/> (accessed 10 December 2011)
- Sidorov, Petr, and Gregory J. Singh. *Russian-American Security*. Nova Science Publishers, Inc., New York, 2010
- The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*. The Protection of the Arctic Marine Environment Working Group, April 29, 2009
<http://www.pame.is/amsa/amsa-2009-report> (accessed 10 December 2011)
- The Arctic Council. *The Ilulissat Declaration*. The Protection of the Arctic Marine Environment Working Group, May 28, 2008 <http://www.pame.is/amsa/amsa-2009-report> (accessed 10 December 2011)
- The International Institute for Strategic Studies. "Diplomatic Shifts in the Warming Arctic." *IISS Strategic Comments*, Volume 16, Comment 50, December 2010
<http://www.iiss.org/publications/strategic-comments/past-issues/volume-16-2010/december/> (accessed 10 December 2011)
- The International Institute for Strategic Studies. *Strategic Survey 2010: The Annual Review of World Affairs*. Routledge, Taylor & Francis Group, New York, New York, 2010
- The White House. *NSPD-66 / HSPD-25*. National Security Presidential Directive and Homeland Security Presidential Directive, January 9, 2009 <http://www.fas.org/irp/offdocs/nspd/nspd-66.htm> (accessed 7 January 2012)
- Titley, David W. and Courtney C. St. John. "Arctic Security Considerations and the U.S. Navy's Roadmap for the Arctic." *Naval War College Review*, vol. 63, no. 2, (Spring 2010), p. 35-48
<http://www.usnwc.edu/getattachment/e0734d9a-386e-4a2c-ba9d-86e7b290c57f/Arctic-Security-Considerations-and-the-U-S--navy-s> (accessed 9 December 2011)
- United Nations Convention on the Law of the Sea of 10 December 1982*.
http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm (accessed on 23 January 2012)
- US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*. 2008
<http://www.uscg.mil/history/docs/2008CRSUSCGPolarOps.pdf>
- US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*. ABS Consulting, Arlington, VA, 2010
<http://assets.fiercemarkets.com/public/sites/govit/hlsummarycapstone.pdf> (accessed 10 December 2011)
- US House of Representatives. Climate Change and the Arctic: New Frontiers of National Security, Hearing before the Committee on Foreign Affairs, 111th Cong, 1st session, 2009.
- Vatansever, Adnan. "Russia's Oil Exports: Economic Rationale Versus Strategic Gains." *Carnegie Endowment for International Peace*, December 2010
<http://carnegieendowment.org/2010/12/15/russia-s-oil-exports-economic-rationale-versus-strategic-gains/27r> (accessed 23 January 2012)

Notes

(All notes appear in shortened form. For full details, see the appropriate bibliography entry.)

¹ Hugo Ahlenius. "The decrease of Arctic sea ice, minimum extent in 1982 and 2007, and climate projections." *UNEP/GRID-Arendal*, December 2007.
<http://maps.grida.no/go/graphic/the-decrease-of-arctic-sea-ice-minimum-extent-in-1982-and-2007-and-climate-projections> (accessed 5 February 2012). Note that the top and bottom of the figure are from different years. The 2010-2030 and beyond charts are from 2004, and likely greatly overstate the amount of ice to be present in the Arctic, as it had already melted beyond the 2060 prediction by 2007. From observations, Arctic ice may be decreasing much more quickly than was predicted.

² NSPD-66/HSPD-25, Section III.B.1.

³ Grant, Shelagh D., *Polar Imperative: A History of Arctic Sovereignty in North America*, 125

⁴ Dygas, Joseph A. Christopher Gibson, Thomas C. Mowatt, and Aden L. Seidlitz. *Mineral Resources of Western Arctic Alaska*, U. S. Department of the Interior, Bureau of Land Management, November 1991.

http://www.blm.gov/pgdata/etc/medialib/blm/ak/aktest/ofr.Par.47073.File.dat/OFR_39.pdf (accessed 4 February 2012)

⁵ Grant, 6

⁶ *Ibid.*, 132 and 183

⁷ *Ibid.*, 133

⁸ Institute of the North, U.S. Arctic Research Commission, and International Arctic Science Committee. *Arctic Marine Transport Workshop 28-30 September 2004*

⁹ Rowe, Elana W. *Russia and the North*, 7

¹⁰ National Snow and Ice Data Center. "State of the Cryosphere: Is the cryosphere sending signals about climate change?" 29 November 2011. http://nsidc.org/cryosphere/sotc/sea_ice.html (accessed 4 February 2012)

¹¹ *Ibid.*

¹² National Snow and Ice Data Center, *Average Monthly Arctic Sea Ice Extent August 1979 to 2011*. http://nsidc.org/images/arcticseaicenews/20110906_Figure3.png (accessed 15 January 2012)

¹³ Grant, 439

¹⁴ NSPD-66/HSPD-25, Section II.A.

¹⁵ Smith, James. "US Deputy Secretary of State: Arctic region will be next international strategic challenge." *Belfer Center for Science and International Affairs*, September 30, 2010. http://belfercenter.ksg.harvard.edu/publication/20387/us_deputy_secretary_of_state.html (accessed 10 February 2012)

¹⁶ NSPD-66/HSPD-25, Section III.B.1.

¹⁷ *Ibid.*

¹⁸ *Ibid.*, Section III.B.2.

¹⁹ *Ibid.*, Section III.B.3.

²⁰ *Ibid.*, Section III.B.4.

²¹ *Ibid.*, Section III.B.5.

²² *Ibid.*, Section III.B.6.

²³ Grant, 453

²⁴ US House of Representatives. Climate Change and the Arctic: New Frontiers of National Security, 2; and Bird, Kenneth J., Ronald R. Charpentier, Donald L. Gautier, David W. Houseknecht, Timothy R. Klett, Janet K. Pitman, Thomas E. Moore, Christopher J. Schenk, Marilyn E. Tennyson, and Craig J. Wandrey. *Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*, 4

²⁵ Blank, Stephen J. *Russia in the Arctic*, 3

²⁶ Roto, Johanna and José Sterling. "Resources in the Arctic." NORDREGIO Nordic Center for Spatial Development.

<http://www.nordregio.se/templates/nordregio/pages/tni.aspx?imgurl=/Global/Maps/Per%20theme/05%20Environment%20and%20energy/0837%20resources%20arctic.jpg&imgwidth=558> (accessed 22 January 2012)

²⁷ US House of Representatives. Climate Change and the Arctic: New Frontiers of National Security, 2; and Bird, Kenneth J., Ronald R. Charpentier, Donald L. Gautier, David W. Houseknecht, Timothy R. Klett, Janet K. Pitman, Thomas E. Moore, Christopher J. Schenk, Marilyn E. Tennyson, and Craig J. Wandrey, 1; and O'Rourke, Ronald. *Changes in the Arctic: Background and Issues for Congress*, 15

²⁸ Colvin, Christopher C. Rear Admiral, Deputy Commander Pacific Area, United States Coast Guard; and Joling, Dan. "Engine problems sideline Coast Guard icebreaker." *The Associated Press*, June 30, 2010. http://www.newsminer.com/view/full_story/8102525/article-Engine-problems-sideline-Coast-Guard-icebreaker- (accessed 14 January 2012)

²⁹ Colvin; and Joling, Dan. "Engine problems sideline Coast Guard Icebreaker." *The Associated Press*, 30 June, 2010. http://www.newsminer.com/view/full_story/8102525/article-Engine-problems-sideline-Coast-Guard-icebreaker- (accessed 14 January 2012); and "Ice bound: Polar icebreakers frozen in the federal budget." *Fairbanks Daily News Miner*, 17 February, 2011. <http://www.newsminer.com/bookmark/11478537--Ice-bound-Polar-icebreakers-frozen-in-the-federal-budget> (accessed 4 February 2012)

³⁰ Colvin; and US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 17.

³¹ US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, 10

³² US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 3

³³ *Ibid.*, 3 and 4

³⁴ Committee on the Assessment of U.S. Coast Guard Polar Icebreaker Roles and Future Needs. *Polar Icebreakers in a Changing World: An Assessment of U.S. Need*, 57; and US Coast Guard. "USCG Polar Star History." <http://www.uscg.mil/pacarea/cgcpolarstar/history.asp> (accessed 4 February 2012)

³⁵ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 11

³⁶ *Ibid.*

³⁷ *Ibid.*

³⁸ *Ibid.*

³⁹ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 12; and Joling, Dan. "Coast Guard: Arctic Response Capability Lacking." *Associated Press*, 12 August 2011. http://www.newsminer.com/view/full_story/15065912/article-Coast-Guard--Arctic-response-capability-lacking-? (accessed 5 February 2012)

-
- ⁴⁰ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 11
- ⁴¹ Ibid.
- ⁴² US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 14; and Joling, Dan. "Coast Guard: Arctic Response Capability Lacking." *Associated Press*, 12 August 2011. http://www.newsminer.com/view/full_story/15065912/article-Coast-Guard--Arctic-response-capability-lacking-? (accessed 5 February 2012)
- ⁴³ Colvin
- ⁴⁴ Ibid.
- ⁴⁵ 176th Wing Home Page. <http://www.176wg.ang.af.mil/shared/media/document/AFD-081231-052.pdf> (accessed 16 January 2012)
- ⁴⁶ The 176th provides Search and Rescue support to fighter aircraft flying at Eielson AFB.
- ⁴⁷ U.S. Department of the Interior, Bureau of Land Management, Alaska. http://www.blm.gov/ak/st/en/prog/recreation/dalton_hwy.html (accessed 16 January 2012)
- ⁴⁸ U.S. Department of the Interior, Bureau of Land Management, Alaska. "Know before you go!" http://www.blm.gov/ak/st/en/prog/recreation/dalton_hwy/dalton_know.html (accessed 5 February 2012)
- ⁴⁹ A good illustration of this comes from D'Oro, Rachel. "Hose laid for fuel transfer at iced-in Alaska town." *The Associated Press*, January 16, 2012. http://www.newsminer.com/view/full_story/17188611/article-Hose-laid-for-fuel-transfer-at-iced-in-Alaska-town?instance=home_news_window_left_top_1 (accessed 16 January 2012)
- ⁵⁰ U.S. Department of the Interior, Bureau of Land Management, Alaska. "Know before you go!" http://www.blm.gov/ak/st/en/prog/recreation/dalton_hwy/dalton_know.html (accessed 5 February 2012)
- ⁵¹ Colvin; and US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 12; and O'Rourke, 56.
- ⁵² US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 12; and US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, 11
- ⁵³ Colvin
- ⁵⁴ Canadian Coast Guard, Search and Rescue, Alerting, Detection & Response. http://www.ccg-gcc.gc.ca/eng/ccg/sar_adr (accessed 16 January 2012; and Vergano, Dan, "More Northern Lights Sky Shows Coming from Solar Storms." *USA Today*, January 28, 2012. <http://www.usatoday.com/tech/science/columnist/vergano/story/2012-01-28/solar-flare-northern-lights/52824828/1> (accessed 5 February 2012); and Chomicz, Dorothy. "Solar storm produces outstanding aurora over Alaska as airlines, telecom companies fret over disruptions." *Daily News Miner*, 25 January 2012 http://www.newsminer.com/view/full_story/17283066/article-Solar-storm-produces-outstanding-aurora-over-Alaska-as-airlines--telecom-companies-fret-over-disruptions? (accessed 5 February 2012)). We are entering a period of such disruptions. A relatively minor S3 class flare disrupted HF radio signals for two days on January 23-24, 2012. Much larger flares can be expected as Earth nears the peak of this solar cycle in 2013, causing longer and more widespread disruptions
- ⁵⁵ Bureau of Ocean Energy Management. Alaska Region. "About the Alaska Region - Did you know?" <http://www.alaska.boemre.gov/aboutak/aksize/aksize.htm> (accessed 5 February 2012)
- ⁵⁶ Colvin; and Farrell, Brett. Marine Exchange of Alaska Assistant Director

-
- ⁵⁷ Farrell; and Marine Exchange of Alaska Home Page. <http://www.mxak.org/home/programs.html> (accessed 25 January 2012)
- ⁵⁸ Farrell
- ⁵⁹ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 15.
- ⁶⁰ The Arctic Council. "About the Arctic Council." <http://www.arctic-council.org/index.php/en/about-us> (accessed 22 January 2012)
- ⁶¹ The Arctic Council. "Marine Biodiversity." 22 September, 2011. <http://www.arctic-council.org/index.php/en/oceans/103-emergency-preparedness/202-marine-biodiversity> (accessed 22 January 2012); and Winter, Allison. "U.S. Bans Commercial Fishing in Warming Arctic." *The New York Times*, 21 August 2009. <http://www.nytimes.com/gwire/2009/08/21/21greenwire-us-bans-commercial-fishing-in-warming-arctic-33236.html> (accessed 22 January 2012)
- ⁶² The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*, 6
- ⁶³ Ibid.
- ⁶⁴ Ibid., 7
- ⁶⁵ Grant, , 454; and Blank, 23; and US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 3
- ⁶⁶ Fish, Tim, Edward Lucas and Jon Rosamond. "Arctic Countries vying for a piece of the ice seek to strengthen regional presence." *Jane's Navy International*, September 2008; and Grant, 443; and Natynczyk, Walt. "Canada's Strategic Outlook." *The All Party Parliamentary Group on Transatlantic and International Security*, 25 January, 2011. <http://www.henryjacksonsociety.org/stories.asp?pageid=49&id=1948> (accessed 23 January 2011)
- ⁶⁷ Fish, Tim, Edward Lucas and Jon Rosamond. "Arctic Countries vying for a piece of the ice seek to strengthen regional presence." *Jane's Navy International*, September 2008; and Huebert, Rob. *Welcome to a new era of Arctic Security*, 1.
- ⁶⁸ Zhang, Jiansong. "Create a scientific investigation of China's polar icebreaker program in 2013." *Xinhua*, November 19, 2009. http://translate.google.com/translate?hl=en&sl=zh-N&u=http://news.xinhuanet.com/tech/2009-11/19/content_12495351.htm&ei=294AT8enKqnX0QGRuameEA&sa=X&oi=translate&ct=resu&resnum=1&sqi=2&ved=0CCkQ7gEwAA&prev=/search%3Fq%3Dhttp://news.xinhuanet.com/tech/2009-11/19/%26hl%3Den%26safe%3Dactive%26biw%3D1344%26bih%3D650%26prmd%3Dimvns (accessed 23 January 2012); and Xinhua. *China's new polar icebreaker to launch in 2013*. People's Daily Online, June 22, 2011. <http://english.peopledaily.com.cn/90001/90776/90881/7416709.html> (accessed 9 December 2011)
- ⁶⁹ Greenert, J. W. *U.S. Navy Arctic Roadmap*, 3
- ⁷⁰ Colvin; and "Ice bound: Polar icebreakers frozen in the federal budget." *Fairbanks Daily News Miner*. February 1, 2011. <http://www.newsminer.com/bookmark/11478537--Ice-bound-Polar-icebreakers-frozen-in-the-federal-budget> (accessed 23 January 2012)
- ⁷¹ US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, 12
- ⁷² Ibid., 13

⁷³ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 11; and Committee on the Assessment of U.S. Coast Guard Polar Icebreaker Roles and Future Needs, 2; and US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, 10

⁷⁴ Isachenkov, Vladimir. "Russia confident its Arctic claim will succeed." *Bloomberg Businessweek*, September 22, 2010.
<http://www.businessweek.com/ap/financialnews/D9ICUMBO0.htm> (accessed 23 January 2012); and Russia Today. "Scientists continue work to substantiate Russia's Arctic claims." October 9, 2010. <http://rt.com/news/sci-tech/arctic-lomonosov-ridge-expedition/> (accessed 23 January 2012).

⁷⁵ Kandiyoti, Rafael. *Pipelines: Flowing Oil and Crude Politics*, 153; and Sidorov, Petr, and Gregory J. Singh. *Russian-American Security*, 72; and Grant, 445; and Rowe, 25

⁷⁶ Sidorov, Petr, and Gregory J. Singh, 72; and Kandiyoti, 454; and Baev, Pavel K. *Russian Energy Policy and Military Power: Putin's Quest for Greatness*, 32

⁷⁷ Grant, 454; and Blank, 103; and Vatansever, Adnan. "Russia's Oil Exports: Economic Rationale Versus Strategic Gains," 12

⁷⁸ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 4; and US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 1

⁷⁹ Qian, Wang. *Arctic research set to be beefed up*. *China Daily*, May 6, 2010.
http://www.chinadaily.com.cn/cndy/2010-05/06/content_9814740.htm (accessed 9 December 2011)

⁸⁰ International Energy Agency. *World Energy Outlook 2010: Executive Summary*, 5; and Kandiyoti, 226

⁸¹ Pettersen, Trude. "China to boost Arctic research." *Barents Observer*, May 6, 2010.
<http://www.barentsobserver.com/china-to-boost-arctic-research.4781463.html> (accessed 23 January 2012)

⁸² Jakobson, Linda. *China Prepares for an Ice-Free Arctic*, 13; and Lasserre, Frederic. *China and the Arctic: Threat or Cooperation Potential for Canada?* 5

⁸³ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 5; and The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*, 7

⁸⁴ US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 1

⁸⁵ Vatansever, 12; and Corell, Robert and Erik J. Molenaar. *Background Paper: Arctic Shipping*, 10; and The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*, 35

⁸⁶ US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 1

⁸⁷ Colvin; and Farrell

⁸⁸ Colvin; and The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*, 5; and Draper D., S.E.L. Howell, E.J. Stewart, A. Tivy, and J. Yackel. *Cruise tourism in a warming Arctic: Implications for northern National Parks*. University of Calgary, Alberta, 2008.
<http://dspac.ualgary.ca/bitstream/1880/46913/1/Stewart.pdf> (accessed 23 January 2012); and Natyvczyk, Walt. *Canada's Strategic Outlook*

⁸⁹ Colvin; and Farrell

⁹⁰ Jakobson, 10; and Berley, Max, and Lisa Beyer. “To Rule the Arctic’s Waves, U.S. Can’t Waive the Rules: View.”; and US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 14

⁹¹ Colvin; and US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 43

⁹² *United Nations Convention on the Law of the Sea of 10 December 1982*, Part V, Article 56

⁹³ Berley, Max, and Lisa Beyer; and Grant, 380; and US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 15

⁹⁴ The Arctic Council. *The Arctic Marine Shipping Assessment 2009 Report*, 7

⁹⁵ Colvin,

⁹⁶ US Coast Guard. *Report to Congress: U.S. Coast Guard Polar Operations*, 15.

⁹⁷ US Coast Guard. *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, 13

⁹⁸ O’Rourke, 35; and Johnson, Gene. “Admiral: Coast Guard needs greater Arctic presence.” *The Associated Press*, May 30, 2011. http://www.newsminer.com/view/full_story/13492907/article-Admiral--Coast-Guard-needs-greater-Arctic-presence (accessed 16 January 2012)

⁹⁹ O’Rourke, 35; and Johnson, Gene. “Admiral: Coast Guard needs greater Arctic presence.” *The Associated Press*, May 30, 2011. http://www.newsminer.com/view/full_story/13492907/article-Admiral--Coast-Guard-needs-greater-Arctic-presence (accessed 16 January 2012)

¹⁰⁰ Aristov, Mikhail. “Russia to Launch Arctic Satellite Monitoring Project.” *Voice of Russia*, 6 May 2010. <http://eyeontheartctic.rcinet.ca/en/news/russia/90-geopolitics/180-russia-to-launch-arctic-satellite-monitoring-project-> (accessed 13 February 2012); and Pettersen, Trude. “Russia launches satellite project to monitor the Arctic.” *Barents Observer*, 5 May 2012. <http://www.barentsobserver.com/russia-launches-satellite-project-to-monitor-the-arctic.4780927-116321.html> (accessed 13 February 2012)

¹⁰¹ Aristov, Mikhail. “Russia to Launch Arctic Satellite Monitoring Project.” *Voice of Russia*, 6 May 2010. <http://eyeontheartctic.rcinet.ca/en/news/russia/90-geopolitics/180-russia-to-launch-arctic-satellite-monitoring-project-> (accessed 13 February 2012); and Pettersen, Trude. “Russia launches satellite project to monitor the Arctic.” *Barents Observer*, 5 May 2012. <http://www.barentsobserver.com/russia-launches-satellite-project-to-monitor-the-arctic.4780927-116321.html> (accessed 13 February 2012)

¹⁰² US House of Representatives. *Climate Change and the Arctic: New Frontiers of National Security*, 33

¹⁰³ The National Oceanic and Atmospheric Administration’s International Bathymetric Chart of the Arctic Ocean. http://www.ngdc.noaa.gov/mgg/bathymetry/arctic/geodata/plots/bathymaps/ver1_sheet3_legend_geo.jpg (accessed on 5 February 2012)

¹⁰⁴ Murkowski, Lisa. *S. 2849: Arctic Deep Water Sea Port Act of 2009*.

¹⁰⁵ The Arctic Council. *The Ilulissat Declaration*, 1

¹⁰⁶ Berley, Max, and Lisa Beyer; and European Security and Defense Assembly. *Europe’s Northern Security Dimension*, EXPLANATORY MEMORANDUM, Section II.4.28

¹⁰⁷ Berley, Max, and Lisa Beyer; and European Security and Defense Assembly. *Europe's Northern Security Dimension*, EXPLANATORY MEMORANDUM, Section II.4.26; and US House of Representatives. Climate Change and the Arctic: New Frontiers of National Security, 15; and The Associated Press. "Coast Guard commander urges Law of the Sea treaty ratification." *Fairbanks Daily News Miner*, March 5, 2011.
http://www.newsminer.com/view/full_story/12183709/article-Coast-Guard-commander-urges-Law-of-the-Sea-treaty-ratification (accessed 25 January 2012)

¹⁰⁸ Lee, Jeannette J. "New Seafloor Maps May Bolster U.S. Arctic Claims," *National Geographic News*, 12 February, 2008.
<http://news.nationalgeographic.com/news/2008/02/080212-AP-arctic-grab.html> (accessed 5 February 2012)

